

## 6.0 CONCLUSIONS

This chapter summarizes the report conclusions and the lessons learned during the event and provides recommended actions geared to specific judgments of need.

### 6.1 LESSONS LEARNED

The following information is from *Project Hanford Lessons Learned: Contamination Spread Outside of Radiation Control Areas by Fruit Flies*, 1999-RL-HNF-0001, presented in Appendix I, and accessible online at <http://www.hanford.gov/lessons/sitell/1199/199901.htm>.

An effective radiological control program is vigilant in protecting the workers, the public, and the environment and recognizes the possibility of identifying new vectors for spreading contamination. Glycerin/monosaccharide-based fixatives used to hold radioactive contamination in place may attract insects that subsequently can spread contamination. The biological vector, fruit flies, had not been identified previously within the DOE complex and, therefore, was not considered by operations personnel.

Radioactive contamination can be spread by multiple mechanisms, including vegetation and animals. Operations must be monitored and controlled to preclude as many of those transport pathways as possible. Monitoring must be thorough enough to detect unexpected contamination spread. Response systems must be able to contain and control contamination until the spreading mechanism is identified and controlled.

Public reaction to the spread of contamination off Site can be minimized by proactively addressing public health and safety concerns and perceptions through the following:

- Releasing frequent timely status reports to all employees, local news media, and government officials on containment and cleanup efforts
- Monitoring for offsite effects to show that the community is not at risk. In this event, flying-insect traps were set up outside site boundaries to verify that no fruit flies carried contamination beyond the Hanford Site
- Conducting bioassays on request
- Conducting surveys of personal effects on request.

## 6.2 RECOMMENDATIONS

Judgments of Need	Corrective Actions
<b><u>Management</u></b> <ul style="list-style-type: none"><li>• Commitment is needed for evaluating and implementing report recommendations</li></ul>	<ul style="list-style-type: none"><li>• Prepare an action plan for analyzing, ranking, and implementing judgments of need and report recommendations. Complete and successful implementation of the action plan will ensure the following:<ul style="list-style-type: none"><li>- Hanford Site programs and policies produce an integrated approach to safeguarding against new vectors.</li><li>- The Hanford Site is systematically prepared to respond to similar events and protect Site workers, the public, and the environment.</li></ul></li></ul>
<b><u>Project Management</u></b> <p>Protocol bridges need to be established between RL and the PHMC team and the municipalities and regulators who will be involved in responding to events such as this.</p> <p>When working with an offsite agency on the agency's property, RL and the PHMC team need to be sensitive to the agency's work practices and protocols.</p>	<ul style="list-style-type: none"><li>• Evaluate the need for procedures to establish the following, both onsite and offsite:<ul style="list-style-type: none"><li>- Command and control</li><li>- Assigning project managers with the proper skills for the task</li><li>- Establishing and maintaining adequate communication with offsite organizations</li><li>- Creating and maintaining field records</li><li>- Establishing a work planning process that ensures work proceeds safely and quickly.</li></ul></li></ul>

Judgments of Need	Corrective Actions
<b><u>Strategic Planning</u></b> <ul style="list-style-type: none"><li>An integrated long-term strategy is needed for the control of biological encroachment and subsequent contamination transport.</li></ul>	<ul style="list-style-type: none"><li>Implement routine inspections of all Category 2, 3, and 4 facilities to ensure containment integrity.</li><li>Implement the findings for contamination control in DOE/RL-98-77, <i>Control of the Spread of Radioactive Contamination Due to Biological Transport on the Hanford Site</i>.</li><li>Improve integration of biological vector control by assigning responsibility for coordinating appropriate and necessary control of biota-related contamination spread to a single office within FDH to cut across contractor boundaries.</li><li>Integrate uniformity in mitigation and cleanup scope and timeliness.</li><li>Maintain biological vector control through planned operation phases.</li></ul>
<ul style="list-style-type: none"><li>The potential for other biological vectors (e.g., tumbleweeds, moths, birds, snakes, pocket gophers) to encroach on waste sites and transport contamination needs to be evaluated.</li></ul>	<ul style="list-style-type: none"><li>Review the literature for indications that organisms, other than those identified at the Hanford Site, have been involved in contamination transport.</li><li>Review the effectiveness of current notification and information exchanges among Hanford Site contractors to identify actual and potential contamination pathways, and improve where necessary.</li><li>Exchange “lessons learned” from other DOE sites relating to contamination spread by biological vectors.</li></ul>

Judgments of Need	Corrective Actions
<p><b><u>Training</u></b></p> <ul style="list-style-type: none"> <li>Staff acting as spokespersons for PHMC need to be better trained in Site and operations geography.</li> </ul>	<ul style="list-style-type: none"> <li>Provide extensive Site tours and training for such staff so they can orient themselves quickly to the surrounding conditions and hazards in emergency and near-emergency situations.</li> <li>Train these people in media relations and risk communications.</li> </ul>
<ul style="list-style-type: none"> <li>Hanford Site workers need an enhanced awareness of the importance of keeping refuse quantities as low as reasonably achievable, precluding nonconforming material from entering the refuse disposal (landfill) process, recycling equipment and material, and using recycled products more consistently.</li> </ul>	<ul style="list-style-type: none"> <li>Initiate an action that emphasizes educating refuse generators (workers) to reduce the amount of refuse generated, to dispose of all refuse appropriately, and to eliminate nonconforming material from refuse collection.</li> </ul>
<ul style="list-style-type: none"> <li>Media relations training of senior managers needs to be enhanced.</li> </ul>	<ul style="list-style-type: none"> <li>Provide training in media relations and risk communications principles to the staff potentially involved as PHMC spokespersons, including managers and leads.</li> </ul>
<ul style="list-style-type: none"> <li>Managers and others need training in occurrence reporting and occurrence report writing.</li> </ul>	<ul style="list-style-type: none"> <li>Develop a process to identify those who may report occurrences or write occurrence reports and require them to attend appropriate training classes.</li> </ul>
<ul style="list-style-type: none"> <li>Food substances and refuse need to be kept from areas near potential contamination.</li> </ul>	<ul style="list-style-type: none"> <li>Promote worker awareness concerning inappropriate areas for eating and discarding food substances.</li> </ul>
<p><b><u>Barriers</u></b></p> <ul style="list-style-type: none"> <li>Routine refuse monitoring methods need to be established to verify continued integrity of primary protective measures at facilities.</li> <li>Biological vector control and maintenance procedures need to be reviewed to ensure that they provide means to prevent pest incursions into inactive facilities.</li> </ul>	<ul style="list-style-type: none"> <li>Establish a permanent refuse-monitoring and transfer facility or provide comparable statistical verification that monitoring is working.</li> <li>Expand the Site pest control program to include routine surveillance of all facilities to evaluate and recommend the need for control measures so that an inactive facility does not act as a reservoir for potential pest species.</li> <li>Evaluate all refuse containers and install screens and guards wherever animal encroachment is possible.</li> </ul>

<b>Judgments of Need</b>	<b>Corrective Actions</b>
<ul style="list-style-type: none"> <li>Fixatives and other products need to be evaluated for their potential to act as a biological attractant.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare procedures for the testing and use of fixatives, and other products, in and on contaminated areas (approval by the FDH Office of Biological Control, Fire, Safety, Security, etc.)</li> <li>Cease using food-based products (e.g., glycerin/monosaccharide) or ensure adequate barriers to access by biota.</li> </ul>
<ul style="list-style-type: none"> <li>Procedures for removing covers and barriers or otherwise exposing contaminated surfaces need to be reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>Revise procedures to ensure that adequate barriers to access by biota are in place before exposing contaminated surfaces.</li> <li>Assess the need, coordinate with the FDH Office of Biological Control, and implement where necessary, to provide biological vector control before, during, and after exposure of contamination.</li> </ul>
<ul style="list-style-type: none"> <li>Routine and frequent inspection is needed of contaminated areas and facilities with intrusion potential to assess continued barrier integrity.</li> </ul>	<ul style="list-style-type: none"> <li>Assign responsibility for barrier inspection to the FDH Office of Biological Control.</li> <li>Integrate corrections of noted deficiencies through the "Integration Office."</li> <li>Ensure that intrusion potential is examined in routine facility operations and maintenance.</li> </ul>
<b><u>Detection</u></b>	
<ul style="list-style-type: none"> <li>The environmental monitoring activities need to be enhanced to ensure early detection of contamination spread.</li> </ul>	<ul style="list-style-type: none"> <li>Review frequency and scope of radiation surveys at all Hanford sites and facilities, increase coverage of monitoring potential biological vectors (such as flying insects) to determine where increased frequency and scope are warranted, including locations of past contamination spread.</li> </ul>
<ul style="list-style-type: none"> <li>Contractors need to share routine radiation surveillance data.</li> </ul>	<ul style="list-style-type: none"> <li>Establish a "clearing house" for sharing radiation surveys among neighboring contractors and with Site Environmental Monitoring.</li> </ul>

<b>Judgments of Need</b>	<b>Corrective Actions</b>
<b><u>Sample Management</u></b> <ul style="list-style-type: none"> <li>Procedures are needed to identify staff to coordinate and prioritize radiological-sample analysis, determine source terms of facilities, and determine standard sample geometries.</li> </ul>	<ul style="list-style-type: none"> <li>Develop current and concise radiological source-term technical data packages.</li> </ul>
<b><u>Prompt Response</u></b> <ul style="list-style-type: none"> <li>Response teams need to be established for situations that are not true emergencies.</li> </ul>	<ul style="list-style-type: none"> <li>Identify staff who may be likely to serve as PHMC spokespersons.</li> <li>Evaluate and designate emergency and near-emergency procedures and levels of activation.</li> <li>Identify staff needed to lead and participate on ad hoc teams.</li> <li>Revise procedures to grant injunctive powers to those conducting situation investigations so that essential operations are not disturbed.</li> <li>Teach people assigned to response teams how to develop effective communication channels, how to run effective meetings, how to limit extraneous input, and how to control agendas.</li> </ul>
<ul style="list-style-type: none"> <li>Procedures are needed for team and event coordination; facilities and resources need upgrading.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare proposal on evaluating cost effectiveness of upgrading procedures and facilities to manage near-emergency events.</li> </ul>
<b><u>Cleanup</u></b> <ul style="list-style-type: none"> <li>Prompt and adequate cleanup of identified contamination spread is needed.</li> </ul>	<ul style="list-style-type: none"> <li>Assign priority to the immediate mitigation of contamination spread.</li> <li>Assign necessary cleanup equipment (e.g., tumbleweed or garbage compactors) and personnel to ensure timely mitigation of contamination spread.</li> <li>Integrate cleanup and mitigation with surveillance.</li> </ul>